

## **REMARKS**

### **I. Amendments**

Independent claims 1, 5, and 6 have been amended to further clarify the claimed inventions.

Claim 1 is amended by adding language stating that the tube reactor is to be used as an endothermic reactor and language reciting the temperature profile equalization function of the monolith channels by directing flow inwardly towards the axis.

Claim 2 is amended by adding language stating that the tube reactor is to be used as an exothermic reactor and language reciting the temperature profile equalization function of the monolith channels by directing flow outwardly away from the axis.

Claim 6 is amended to provide the antecedent recitation of a tube wall and the recitation of the reduction of the tube wall temperature with the use of the monolith channels directing the feed flow toward the center of the monolith.

### **II. §103 Rejection**

Claims 1 and 5-23 have been rejected as being obvious over Addiego et al (U.S. 6,623,707) in view of Lachman et al (U.S. 4,912,077).

The Applicant refers to the arguments presented in the previous response to this rejection. The arguments presented in the previous response are incorporated herein by reference.

### **III. Response to the Examiner's Response to Applicant's Arguments**

The Examiner summarizes the Applicant's argument as being that the Addiego et al patent fails to teach a flow path of heat within a reactor tube that is directed inwardly or outwardly towards the axial center of the reactor tube. The Examiner argues that the Addiego et al patent teaches a tube reactor in which heat is directed via a coil in which it is directed inwardly and outwardly towards the axial center of its tube reactor.

The Applicant respectfully asserts that the teachings of the Addiego et al patent are something significantly different from the Applicant's claimed invention. The Addiego et al patent shows an axial flow reactor having two or more beds of monolithic catalyst. See column 2, lines 31-41; and the figure. Disposed between the beds of monolithic catalyst is a heat transfer coil for introducing or removing heat. See column 2, lines 53-60; column 3, lines 10-22; and the figure.

The features of the claimed invention are significantly different from the aforementioned features noted as being taught by the Addiego et al patent. One difference is in the design of the claimed tube reactor that uses a monolithic support having uni- or multi-directional channels to direct the flow of heat within the monolith of the tube reactor in order to equalize the temperature profile across the cross-section of the tube reactor. Another difference is that there is no heat being introduced into or removed from the center of the claimed tube reactor by a heat transfer means such as a steam coil. Any change in the amount heat energy within the claimed tube reactor is due to the heat of reaction generated by the endothermic or exothermic reactions that are taking place within the claimed tube reactor instead of additionally being provided by indirect heat transfer means such as a steam coil. The monolith of the claimed invention has channels molded within it so as to direct the process flow or feed in such a way as to direct the heat energy within the tube reactor in the desired direction relative to its axis so as to equalize the temperature profile across the reactor tube. This is something significantly different from what is taught by the Addiego et al patent, which is not concerned about having an even temperature profile across the cross section of its reactor.


The Addiego et al patent merely discloses an axial flow reactor with its process flow passing through the reactor in the axial direction. There is no suggestion that the channels of the monolith are designed to provide a function by which the process flow is directed in a manner so as to direct the changes in heat energy within the monolith generated by the exothermic or endothermic reactions of the process so as to equalize the temperature profile across the cross section of the reactor tube as are described and claimed by the Applicant.

#### **IV. Conclusion**

In view of the above, the Applicant respectfully suggests that the claims now pending in the Application are patentable, thus, early allowance of claims 1, 5-23 is requested.

Respectfully submitted,

JAMES A. WAMBAUGH

By   
Their Attorney, Charles W. Stewart  
Registration No. 34,023  
(713) 241-0260

P. O. Box 2463  
Houston, Texas 77252-2463